

IN THE CLAIMS

Claims :We Claim:

1. (Currently Amended) A ~~diffractive~~Diffractive grating element-(SG) arranged on or embedded within a light-transmittive, ~~preferably planar~~ waveguiding substrate-(S) and arranged to interact with an incident light wave -(W)-in order to couple ~~the~~ energy from said incident light wave -(W)-into said substrate-(S) to form at least one diffracted light wave-(R₊,R₊₊) propagating within said substrate-(S) and corresponding to at least one selected diffraction order, ~~characterized in thatwherein~~ the grating element-(SG) is divided into at least two different grating regions-(BG_{left},BG_{right}; MBG_{left},MBG_{right}) each having different diffractive properties and arranged on opposite sides respect to a transition point-(TP) to form a splitted grating element, where ~~the~~-diffractions generated by said at least two different grating regions-(BG_{left},BG_{right}; MBG_{left},MBG_{right}) are arranged to mutually compensate for ~~the~~a variation in ~~the~~-input angle-(θ) of the incident light wave-(W) to ~~the~~a total diffraction efficiency of the at least one diffracted light wave-(R₊,R₊₊) propagating within said substrate-(S).
2. (Currently Amended) The diffractive grating element-(SG) according to the claim 1, ~~characterized in thatwherein~~ in said splitted grating element-(SG) ~~the~~a grating profile of at least one of the grating regions-(BG_{left},BG_{right}; MBG_{left},MBG_{right}) has an asymmetric period profile, preferably ablazed period profile.
3. (Currently Amended) The diffractive grating element-(SG) according to the claim 1, ~~characterized in thatwherein~~ said splitted grating element-(SG) is arranged to be symmetrically splitted, i.e.that is, the element comprises two grating regions (BG_{left},BG_{right}) ~~whosehaving~~ grating period profiles ~~are~~-arranged asto-be substantially mirror images of each other with respect to a transition point-(TP).
4. (Currently Amended) The diffractive grating element-(SG) according to the claim 1, ~~characterized in thatwherein~~ said splitted grating element-(SG) comprises at least two grating regions-(BG_{left},BG_{right}) ~~whosehaving~~ grating period profiles ~~are arranged to have~~with substantially different depths.

5. (Currently Amended) The diffractive grating element-(SG) according to the claim 1, ~~characterized in thatwherein~~ in said splitted grating element-(SG) the diffraction efficiency of at least one of the grating regions-($BG_{left}, BG_{right}; MBG_{left}, MBG_{right}$) is arranged to vary at different local distances measured from the transition point-(TP).
6. (Currently Amended) The diffractive grating element-(SG) according to the claim 1, ~~characterized in thatwherein~~ the transition point-(TP) is arranged to be located within ~~the~~an area where the incident light wave-(W) first interacts with the splitted grating element-(SG).
7. (Currently Amended) The diffractive grating element-(SG) according to the claim 1, ~~characterized in thatwherein~~ ~~the~~a first interaction of the incident light wave-(W) with the splitted grating element-(SG) is arranged to take place substantially within a single grating region-(MBG_{right}).
8. (Currently Amended) The diffractive grating element-(SG) according to the claim 7, ~~characterized in thatwherein~~ at least one of the grating regions (MBG_{left}) is arranged to redirect or recirculate the light wave waveguided within the substrate-(S) back towards a reverse direction inside the substrate-(S).
9. (Currently Amended) The diffractive grating element-(SG) according to the claim 1, ~~characterized in thatwherein~~wherein the splitted grating element-(SG) is arranged to enlarge ~~the~~an exit pupil of an optical system.
10. (Currently Amended) The diffractive grating element-(SG) according to the claim 1, ~~characterized in thatwherein~~ the splitted grating element-(SG) is arranged to enlarge ~~the~~an exit pupil of a biocular or monocular optical system.
11. (Currently Amended) The diffractive grating element-(SG) according to the claim 1, ~~characterized in thatwherein~~ the splitted grating element-(SG) is arranged to enlarge ~~the~~an exit pupil of a virtual display.